



Frosty Pod caused by *Moniliophthora roreri*

**Dr. Lyndel Meinhardt**, Research Leader  
301-504-1995, [meinharl@ba.ars.usda.gov](mailto:meinharl@ba.ars.usda.gov)  
Genetic analysis of fungal pathogens that cause diseases of *Theobroma cacao*. Research focus is to understand the function of diversity in these fungal pathogens so that better control methods can be developed.

**Dr. Bryan Bailey**, Plant Pathologist  
301-504-7985, [baileyb@ba.ars.usda.gov](mailto:baileyb@ba.ars.usda.gov)  
Plant microbe interactions in cacao and biocontrol of cacao diseases. Molecular tools are used to characterize cacao plant defense responses and to optimize disease control methods including biocontrol.



Basidiocarp of *Crinipellis perniciosa*

**Dr. V.C. Baligar**, Soil Scientist  
301-504-6492, [vbaligar@asrr.arsusda.gov](mailto:vbaligar@asrr.arsusda.gov)  
Response of cacao and tropical legume cover crops to abiotic stresses (soil acidity, elemental toxicity/deficiency, CO<sub>2</sub>, light quality). Research includes development of agroforestry-based best management practices in South America for sustainable cacao production.



Nutrient amendment in Cacao

**Dr. Ronald Collins**, Agronomist  
301-504-6135, [collinsr@ba.ars.usda.gov](mailto:collinsr@ba.ars.usda.gov)  
Integrated pest management systems utilizing pesticides, biocontrol agents, cultural and management practices for agronomic and horticultural systems.



Witches broom caused by *Crinipellis perniciosa*

**Dr. Prakash Hebbar**, Visiting Scientist  
301-504-7007, [hebbarp@ba.ars.usda.gov](mailto:hebbarp@ba.ars.usda.gov)  
Senior Research Scientist with Mars Inc (under Cooperative agreement with USDA) responsible for research coordination, networking and technology transfer of IPM strategies of cacao pests and diseases to the origin countries. Emphasis on the use of environmentally friendly options such as biological control, rational use of chemicals and pheromones.

**Dr. Charles Helling**, Soil Scientist  
301-504-6645, [hellingc@ba.ars.usda.gov](mailto:hellingc@ba.ars.usda.gov)  
Environmental risk assessment of pesticides used or proposed for sustaining production of cacao, banana, and other tropical crops as alternatives to illicit drug crops in South America.



Flume for stream water monitoring of pesticides.

**Dr. Robert Lumsden**, Visiting Scientist  
301-504-5094, [lumsdenr@ba.ars.usda.gov](mailto:lumsdenr@ba.ars.usda.gov)  
Scientific Advisor with WCF (World Cocoa Foundation) under a Specific Cooperative Agreement with USDA for cacao research. Liaison between industry and USDA cacao research activities.



Pods of *Theobroma cacao*

**The mission of the Sustainable Perennial Crops Laboratory** is to carry out research on perennial crops of significance to national and global economies with the goals of improving and/or maintaining crop yields with reduced inputs, preserving and optimizing use of crop genetic diversity, reducing the negative environmental impacts resulting from crop production, and providing consumers and manufacturers with safe and stable commodity supplies.

### Research emphasis:

A. Biological and Chemical Disease Control and Development of Agronomic Systems for Cacao and Alternative Crops

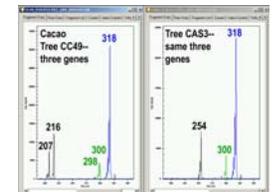
B. Environmental Quality Impacts from Pesticide Use on Perennial Crops

C. Molecular Characterization and Diversity Assessment of Cocoa Germplasm in the Americas



Black pod disease caused by *Phytophthora capsici*

**Dr. Dapeng Zhang**, Research Geneticist  
(301) 504-7477, [dzhang@ba.ars.usda.gov](mailto:dzhang@ba.ars.usda.gov)  
Application of interdisciplinary approaches to assist conservation and sustainable use of economically important perennial species used in tropical agriculture and agro-forestry. Research interests range from genebank management, phylogeography to germplasm enhancement.



Fingerprint of *Theobroma cacao*

SPCL is actively collaborating with government and non-governmental research initiatives, NGO's, universities and international research centers in Brazil, Peru, Cameroon, Costa Rica, Ecuador, Panama, Trinidad and the UK. Some of these organizations include:

### US Institutes

#### **Masterfoods/Mars, Inc:**

**WCF:** World Cocoa Foundation, Vienna, VA.

**Penn State:** Pennsylvania State University

**UF-IRREC:** University of Florida, Indian River Research and Education Center, Ft. Pierce, FL.

**UF-TREC:** Tropical Research and Education Center, Homestead, FL

### International Institutes

#### **Almirante Cacao, Brazil**

**CABI:** CAB International, United Kingdom

**CATIE:** Centro Agronomico Tropical de Investigacion y Ensenanza, Costa Rica

**CEPLAC/CEPEC:** Comissao Executiva do Plano da Lavoura Cacaueira/Centro de Pesquisas do Cacau, Brazil

**CIRAD:** Centre de Cooperation Internationale en Recherche Agronomique pour le Developpement, France

**CRU:** Cocoa Research Unit, University of the West Indies, Trinidad and Tobago

**EBCL:** European Biological Control Lab, France

**EMBRAPA/CNPAP:** Empresa Brasileira de Pesquisa Agropecuaria/Centro Nacional de Pesquisa de Arroz e Feijao, Brazil

**ICT:** Instituto de Cultivos Tropicales, Peru

**IESB:** Instituto de Estudos Socia-Ambientais do Sul da Bahia, Brazil

**IITA:** International Institute of Tropical Agriculture, Nigeria

**IPGRI:** International Plant Genetic Resources Institute, Italy

**IRAD:** Institut de Recherche Agricole pour le Developpement, Cameroon

**Imperial College, UK**

**INIAP:** Instituto Nacional Autonomo de Investigaciones Agropecuarias, Ecuador

**STRI:** Smithsonian Tropical Research Institute, Panama

**UESC:** Universidade Estadual de Santa Cruz, Brazil

**UENF:** Universidade Estadual de Norte Fluminense, Brazil

**UNALM:** Universidad Nacional Agraria la Molina, Peru

**University of Reading, UK**

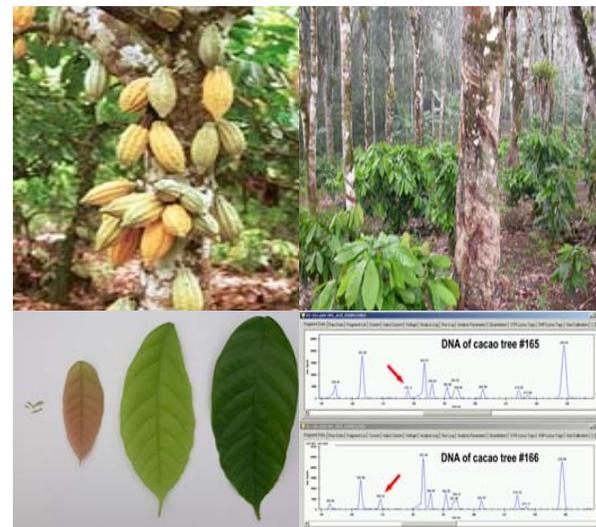


Field plot near El Encano, Peru.



Agricultural Research Service  
U.S. Dept. of Agriculture

## Sustainable Perennial Crops Laboratory



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